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A Literature Review about the Implementation of Artificial Intelligence (AI) Technology in the Hotel Industry in Indonesia

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Indonesia's hospitality industry has experinced significant growth, attracting a growing number of both domestic and international tourist. This growth underscores an urgent need for service innovation, particularly through the adoption of new technologies in a competitive market. This study examines how Artificial Intelligence (AI) is being applied in Indonesia's hotel industry, covering the various implementations of AI, the challenges encountered, and the impacts on hotel operations and guest satisfaction. This research uses a literature study approach, gathering and analyzing 20 scholarly sources from 2023 onward on this topic. The results indicate that AI technologies have started to be implemented in Indonesian hotels, for example through customer service chatbots and automation systems to improve operational efficiency. AI adoption helps to personalize guest services, streamlines processes, and enhances the overall guest experience. However, challenges remain, including limited investment capacity, the need for staff training, data privacy concerns, and

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resistance to change. These findings suggest that optimizing AI integration in Indonesia's hospitality sector can bolster the industry's competitiveness and service quality, provided that the identified challenges are properly addressed.

Keywords: AI applications; AI technology; hospitality; technology.

1. INTRODUCTION

The Ministry of Finance Indonesia considers the hotel industry a key pillar of the national economy due its significant impact on economic growth, (Raditya, 2022). Growth in domestic and international tourist arrivals has increased the demand for quality hotel services. In the hospitality business, customer service is a primary success factor (Astuti et al., 2024)). This sector plays an important role in driving economic growth and employment, and it also accelerates regional infrastructure development (Nabilla, 2024). The industry has been encourged to adopt sustainability principles so that economic growth remains aligned with environmental and cultural preservation (Sulistyo et al., 2023). Recent studies show digital innovations such as big data analytics and machine learning enable destination managers to understand tourist trends with greater accuracy, allowing marketing strategies and tourism product development to align more closely with market needs (Maharani, 2025). Additionally, integrating technology into Indonesia's tourism sector strengthens destination competitiveness in the global markets.

AI adoption in hotels offers promising solutions to overcome the limitations of conventional service. AI can perform routine tasks automatically and rapidly, and it can even interact with guests in a human like manner. Artificial intelligence is defined as intelligence exhibited by machines to perform cognitive functions similar to human abilities (Handoko et al., 2024) (Setiawan, 2024). In another definition, AI merges algorithms and data to build systems that generate solutions to problems and make autonomous decisions like humans (Siddhi, 2021). According to Russell and Norvig, artificial intelligence is a core field of advanced technology that encompasses machine learning, natural language processing, and robotics (Handoko et al., 2024).

In hospitality, AI spans a variety technologies, including personalization, robotics, conversational systems such as chatbots, forecasting systems, language translation applications, and more (Bulchand-Gidumal et al., 2024). Thorough AI, computer systems learn from historical data and produce predictions or recommendations (Yusuf et al., 2024). This allows hotels to better understand customer needs and respond more quickly.

AI powered chatbots provide 24/7 service, answer guest questions in multiple languages, and offer personalized suggestions such as local attractions or restaurants (Al-Hyari et al., 2023) (Astuti et al., 2024). In Indonesia, many innovative hotels have started adopting virtual concierges and recommendation systems to increase guest loyalty and enhance the guest experience, and reshape service structures in the hotel industry, for example The Anmon Resort Bintan (Wibisono and Hartini, 2022). The ARTOTEL Group has also integrated AI, the Internet of Things, and data analytics as the core of its digital strategy to deliver services personalized to guest preferences (Anshori, 2025). AI analyzes guest data at scale and generates preference predictions, including room type choices, dining menus suggestions, and favored activities, so that hotels can offer customized services for each guest (Tunjungsari et al., 2025).

Several hotels in Indonesia have integrated artificial intelligence as an innovative step in the hotel industry. Their regional distribution includes DKI Jakarta, West Java, Banten, and Bali. These hotels serve as examples of properties in Indonesia which have integrated AI technology with explicit public evidence from official websites.

Rini (2021) notes that Indonesia's hotel system operates amid high cultural and linguistic diversity (Rini, 2021). Traditional services often face obstacles, including language barriers and cultural misunderstandings. Guest complaints about hotel services remain common, for example slow front desk responses during reservation processes and limited foreign language proficiency among staff (Mahena et al., 2025). A study in Bali reported complaints about front office services stemming from unresponsive service, inaccurate information,

and room assignment issues at The Westin Resort Nusa Dua Bali (Pratiwi et al., 2021). These conditions highhlight the need for innovation to improve the speed, accuracy, and personalization of hotel services.

A hotel is a service business that provides accommodation, food and beverages, and other supporting facilities to meet guest needs during a stay (Soewarno et al., 2021). In Indonesia, the hotel industry plays a strategic role in supporting tourism because it is a main factor influencing tourist satisfaction and revisit intention (Septiani and Alim, 2024). Technological developments push hotels to adapt, including by integrating artificial intelligence into operations and services (Yolanda and Rakhmawati, 2025). This innovation enhances the guest experience. It also helps hotels maintain competitiveness in a more competitive market through responsive, relevant, and customer-focused services (Maulina, 2023). Rapid advances in digital technology in Indonesia have driven service transformation across sectors (Herlambang and Fathoni, 2023). The hotel industry is no exception, and must adapt to developments that shift service structures toward more modern and digitalized models.

The world is entering the Society 5.0 era, where artificial intelligence is increasingly implemented in daily life to achieve a better quality of life (Fukuyama, 2018). For the hotel industry, operational digitalization has become essential to meet modern customer expectations. The COVID-19 pandemic also accelerated the adoption of automation and AI in hotel services to reduce physical contact. Service automation using robots and AI in services is known as RAISA, Robotics, Artificial Intelligence, and Service Automation (Wu et al., 2023). In hotels, RAISA includes service robots, virtual assistants, and intelligent systems that replace or support human roles in service delivery. These technologies perform routine tasks such as front desk service, concierge duties, area cleaning, and even human communication (Yassin et al., 2022). A concierge robot greets guests, delivers items, provides hotel information, and cleans rooms (Ohyver et al., 2025). AI chatbots on hotel websites or apps handle guest inquiries in real time, which increases operational efficiency and helps increase guest numbers (Azizah and Juharandi, 2024). Several studies show that during the pandemic guests were more accepting of hotels that used robots and AI for health reasons and were receptive to robotic services in hotels (Kim et al., 2021) (Shin and Kang, 2020). For example, hotels adopted self-service kiosks and virtual assistants to minimize direct interaction without sacrificing guest comfort. According to Karman (2021), AI integration within an industry requires strategic management aligned with national interests, so the technology delivers positive impact for people (Karman, 2021).

Although global trends show wider AI adoption in the hotel sector (Limna, 2023), implementation in Indonesia remains in a developing stage. Many midscale hotels have not yet leveraged AI optimally due to limited technology investment, limited knowledge, and the readiness of digital infrastructure (Setiawan et al., 2025). From a research perspective, studies on AI in Indonesia's hotel industry remain limited. Much of the prior literature discusses AI in tourism in general or presents case studies from developed countries. A research gap remains in understanding how AI is applied in Indonesia's hotel industry in a comprehensive way. The Government of Indonesia has shown support for digital transformation in tourism through investment in AI research, collaboration between government and private actors to find integration solutions, and regulatory frameworks that support ethical AI use (Jaelani et al., 2024). The effectiveness of AI in practice depends on industry readiness to adopt this innovation. The urgency of this study lies in the need to understand the extent of AI application in Indonesia's hotel industry, the constraints encountered, and the impacts produced. This understanding enables industry actors and policymakers to formulate appropriate strategies (Musfah, 2021), so AI implementation strengthens competitiveness and service quality in Indonesia's hotels.

Based on the above, the research questions are as follows. 1) How is artificial intelligence technology currently applied in Indonesia's hotel industry. 2) What positive impacts does AI implementation have on hotel operations and customer experience in the hotel industry. 3) What challenges are faced in implementing AI in Indonesia's hotel industry. These questions align with the objectives of this study, which are to identify the application, impacts, and challenges of artificial intelligence in Indonesia's hotel industry.

Table 1. List of hotel using AI technology

No	Hotel name	Artificial intelligence technology	Artificial intelligence type
1	Grand Sahid Jaya, Jakarta	Robot *Food Server*	*Robotics*
2	Pullman Bandung Grand Central	Robot *Lobby Ambassador* "Mano"	*Robotics*
3	JHL Solitaire, Gading Serpong	Disinfectant Robot (UV-C & *Dry Mist)*	*Robotics*
4	ASTON Inn Jemursari, Surabaya	Google Nest-based Voice Assistant	*Natural Language Processing*
5	HARRIS Vertu Hotel Harmoni, Jakarta	Floor Cleaning Robot	*Robotics*
6	The Bandha Hotel & Suites, Legian Bali	*Chatbot* AI *Quicktext* Velma	*Natural Language Processing*
7	Bali Niksoma Boutique *Beach Resort*, Bali	*Chatbot* AI *Quicktext* Velma	*Natural Language Processing*
8	The Magani Hotel *and* Spa, Legian Bali	*Chatbot* AI *Quicktext Velma*	*Natural Language Processing*
9	Hyatt Recency Bali	Beach Cleaning Robot "BeBot" (Sanur)	*Robotics*
10	Andaz Bali	Beach Cleaning Robot "BeBot" (Sanur)	*Robotics*
11	Grand Hyatt, Bali	Beach Cleaning Robot "BeBot" (Nusa Dua)	*Robotics*

(MediaIndonesia, 2021; Kompas, 2021; Fitrianto, 2021; Aston, 2025; JakartaJive, 2022; Quicktext, 2025; TheBaliSun, 2023; BaliDiscovery, 2023; NOWBali, 2023)

2. METHODOLOGY

This study uses a literature review method. The design gathers and analyzes secondary data from prior studies on AI adoption in the hotel industry. The study applies a narrative review approach, which surveys existing literature to distill core knowledge of the field (Yam, 2024). Zed outlines four stages of a literature review, 1) preparing tools supporting the study, 2) preparing references or sources relevant to the study, 3) allocating time, 4) processing sources by reading and writing references serving as the study's foundation (Adlini et al., 2022). This study focuses on literature aligned with the research objectives, then synthesizes findings across sources to provide a theoretical and conceptual foundation (Asmara et al., 2023). To preserve scientific accountability, the review sets a clear scope, defines inclusion and exclusion criteria, and targets a specific conceptual contribution to hospitality and AI. These principles align with review-writing guidance stressing transparency, traceability, and consistent reporting from identification through the original evidence (Page et al., 2021). The researcher follows systematic steps from planning, searching, and extraction to reporting results to enable replication and updating in similar contexts (Wibowo and Putri, 2021).

Data sources consist of secondary literature from scholarly publications, prioritizing recent works, including journal articles, e-books, and books published between 2023 and 2025. This window ensures relevance to current AI developments and conditions in Indonesia's hotel industry. The search uses Google Scholar with Indonesian keywords, including "Penerapan AI" (3,420), "Teknologi AI" (18,100), "Perhotelan" (18,200), and "Penerapan Artificial Intelligence di Industri Perhotelan Indonesia" (2,460). Screening begins with keyword scoping, then filters by year, 2023 to 2025, and document type. Selection applies three screening stages, title, abstract, and core findings, with inclusion requiring hotel context in Indonesia, focus on AI adoption, impacts, or challenges, and clear method reporting. Exclusion removes studies outside the hotel industry. Quality appraisal reviews topic relevance, rigor of design, data sufficiency, and clarity of findings. Data extraction captures title, authors, year, method, and key findings. The data are structured in a table for thematic mapping. Thematic synthesis yields four themes, AI implementation, operational impacts, guest experience, and challenges. From the total hits for the main keyword, 2,460, twenty journal articles met the criteria.

The researcher also maintains sound reference management using Mendeley as the reference

manager by downloading the refman file and importing it into the Mendeley library. The search strategy documents keyword lists, year filters, and document types, then embeds this trail in a fact-finding file so an audit trail remains available in line with honest reporting. This reporting follows academic integrity principles for truthful research communication (Bancong, 2025). Given the breadth of Google Scholar, results undergo layered screening of titles, abstracts, and full texts, then per-paper appraisal to identify findings in a systematic manner using the academic search engine (Gusenbauer and Haddaway, 2020).

Data analysis follows a systematic and comprehensive approach. Setiawan (2024) describes the Systematic and Comprehensive Review method, which enables direct understanding of content and main findings to build deep insight into the topic under study, the adoption of AI in Indonesia's hotel industry (Setiawan, 2024). According to Sugiyono (2018), analysis proceeds through structured steps. The initial stage extracts data into an evidence table listing study title, authors, year, method, and main topic for all included articles (Sugiyono, 2018). The next stage identifies key findings on AI adoption, operational impacts, guest experience, and implementation challenges, so the discussion rests on reportable data.

3. RESULTS AND DISCUSSION

3.1 Results

The table present the findings of the research.

Table 2. List of reviewed articles

No.	Title & author	Methodology	Main topic
1	Staff and Guest Perspectives on the Application of Chatbots at the Front Desk of Hotels in Gading Serpong. Hidayat & Setiawan, (2024)	Qualitative (Observation & interviews)	The 24/7 front office chatbot (DTB method) improves guest service responsiveness and staff efficiency, despite challenges such as high message volume and training requirements.
2	The Influence of the Internet of Things and Experience on the Revisit Intention of Guests at Aston Inn Jemursari Surabaya. Angkasa et al., (2023)	Quantitative	The use of IoT at Aston Inn Surabaya significantly improves guest experience and revisit intention through guest experience mediation.
3	Exploring the current Status and Future Potential of Robot, Artificial Intelligence, and Sevice Automation in the Indonesia Tourism Industry. Asmoro et al., (2023)	Qualitative descriptive (Literature review)	Examples of RAISA implementation in Indonesian hotels: JHL Hotel (disinfection robot), Pullman Bandung (Mano robot), Aston (Google Nest IoT), and Bobobox (automatic door access and LED lights), which improve service and efficiency.
4	Ethical Challenges in the Hospitality Industry in the Age of Artificial Intelligence. Arisanti, (2023)	Literature review	Identifying ethical challenges in AI in hotels, such as fairness, privacy, transparency, and responsibility, as well as ACKEH (Agile, Communication, Knowledge, Ethics, Empathy, and Hospitality) recommendations in hospitality AI.
5	AI-Based Predictive Analysis on Culinary Product Innovation in the Food and Beverage Industry. Martina et al., (2025)	Descriptive qualitative (interviews, observation, documentation)	The application of AI predictive analytics for culinary innovation at Sheraton Senggigi significantly improves competitiveness and operational efficiency. Success depends on quality data and infrastructure, with challenges including cost, privacy, and resistance.
6	Hotel Review Sentiment Analysis using the BERT Deep Learning	Computational experiment	The SmallBERT model is an AI technology that classifies hotel review

No.	Title & author	Methodology	Main topic
	Method. Chandradev et al., (2023)		sentiment, helping hotel management understand guest satisfaction and improve service.
7	Designing A Digital Innovation Strategy to Improve Personalization and Guest Satisfaction at Artotel Group. Herawan & Susanti, (2025)	Qualitative descriptive (Literature review)	ARTOTEL's digital strategy recommendation is to combine AI, IoT, and data analytics in line with the brand to personalize services more efficiently, thereby increasing guest satisfaction and loyalty.
8	Sustainable Digital Transformation in the Hospitality Industry (Focus: A Study of the Hospitality Industry in Indonesia). Kelsey et al., (2023)	Quantitative	Studies show that hotel leaders must integrate digital capabilities into customer value propositions and operations for sustainable digital transformation..
9	Designing a Hotel Chatbot with Natural Language Processing Chatbot and Button-Based Chatbot Models. Kusnanda et al., (2022)	Prototype development	NLP based hotel chatbots can streamline hotel operations by remaining active 24/7 without human labor, especially in acquiring potential customers.
10	The Effect of IoT (Internet of Things) on Green Operation for Two Hotels in Palangkaraya 2025. Lundjo & Suwarno, (2025)	Literature review	The integration of green operational IoT in hotels in Palangkaraya improves efficiency, customer satisfaction, and competitiveness.
11	Smart Hotel Transformation: Applying Artificial Intelligence (AI) in Hotel Rooms to Enhance Guest Experience Personalization. Alda & Suharto, (2024)	Literature review	The integration of AI in hotel rooms enables personalized guest experiences and improved operational efficiency in the future.
12	Revitalizing the Hospitality Industry with Technological Innovation: Enhancing Competitive Advantage and Customer Experience. Maulina, (2023)	Literature review	Hotels need to implement the latest technology (AI, 24/7 chatbots, smart room IoT) to provide personalized service and competitive advantage.
13	Optimizing Digital Promotion for Juma Eluk Hotel Through 3D Animated Profile Websites. Sugianto, (2025)	Exploratory qualitative	3D animated websites with AI features (dynamic navigation and personalization) can increase user engagement and improve the effectiveness of Hotel Juma Eluk's digital promotions.
14	Leveraging Machine Learning for Sentiment Analysis in Hotel Applications: A Comparative Study of Support Vector Machine and Random Forest Algorithms. Suryadi et al., (2024)	Computational experiment	Analyzes sentiment in hotel booking app reviews using machine learning algorithms, which help hotel management understand guest satisfaction and improved service quality.
15	Digital Transformation in the Hospitality Sector: Exploring the Role of Technology in Streamlining Hotel Operations. Ramadhan & Suharto, (2024)	Literature review	Digital transformation in hotels significantly improves operational efficiency, service quality, and customer satisfaction, but it requires robust infrastructure and thorough employee training.
16	Integration of Artificial Intelligence in Room Reservation Systems.	Literature review	Integrating AI in hotel room reservation system enhances personalization and

No.	Title & author	Methodology	Main topic
	Purbonegoro & Pitanatri, (2024)		efficiency, reducing costs and driving revenue growth, although there are challenges with upfront investment and data security.
17	Analysis of Opportunities and Barriers in the Use of Digital Systems to Optimize Hotel Business Operations. Harji & Suharto, (2024)	Literature review	The main challenges in integrating digital technologies such as AI in the hospitality industry are data security, high costs, and organizational resistance to change.
18	The Impact of Artificial Intelligence, Big Data, and Automation on Human Resource Performance in the Digital Age. Pratama et al., (2023)	Literature review	Finds that AI, big data, and automation can drive efficiency in recruitment, training, and workforce planning for hotels, thereby improving service quality and operational productivity.
19	Innovation in Service Marketing. Huda & SS, (2025)	Literature review	AI and machine learning enable data-driven personalization of services and marketing, which is relevant for increasing booking conversions and hotel guest loyalty.
20	The Fourth Industrial Revolution and Automation: Between Productivity, Risk, and Social Ethics. Permana et al., (2025)	Qualitative	Automation and AI improve efficiency in the service sector, including hotels, but require ethical policies, trained human resources, and strengthened cybersecurity to maintain service quality.

3.2 Discussion

3.2.1 The application of AI in the hospitality industry in Indonesia

AI adoption in Indonesia's hotel industry now encompasses a wide range of digital innovations, from interactive chatbots to smart room systems. For example, Hidayat and Setiawan reports hotels in Gading Serpong have developed decision tree based (DTB) chatbots at the front office that operate 24/7 to handle guest inquiries more quickly (Hidayat and Setiawan, 2024). These chatbots facilitate guest services and reduce front desk workload. Similary, Kusnanda et al. (2022) find natural language processing and button based chatbots serve guests in real time without human intervention, providing information, supporting sales and marketing, and answering general questions (Kusnanda et al., 2022). The use of IoT is also expanding. Angkasa et al. (2023) report IoT devices at Aston Inn Jemursari, Surabaya, significantly improve the guest experience through room service automation, including temperature, lighting, and alarm settings, as well as voice communication with front office staff (Angkasa et al., 2023).

At the level of service automation, Asmoro et al. (2023) examined RAISA, Robotics, AI, and Service Automation, in several Indonesian hotels (Asmoro et al., 2023). Examples include a disinfectant robot at Hotel JHL Solitaire, service robots at Pullman Bandung, and automatic door access plus LED lighting controls in capsule rooms at Bobobox. These initiatives improve operational efficiency and service consistency. Another area of AI integration involves analyzing guest data analytics for personalization. Herawan and Susanti recommend combining AI with data analytics in line with brand promotion strategies to enhance personalized services for guests (Herawan and Susanti, 2025; Sugianto, 2025).

In summary, Indonesia's hotel industry has begun to adopt intelligent technologies, including chatbots, IoT, robots, AI, and automation, across its operational areas. The industry is moving toward smart hotels models thats offer adaptive, data driven services (Alda and Suharto, 2024).

3.2.2 The positive impact of AI implementation on hotel operations

AI adoption has delivered positive impacts on hotel operational efficiency (Pratama et al., 2023). Multiple studies affirm that comprehensive digital transformation streamlines internal processes and raises productivity. Research in Yogyakarta Province found hotel leaders need

strategies that integrate digital elements into the value proposition and business operations, for example integrated management systems that support sustainable digital transformation (Kelsey et al., 2023). This transformation enables faster and more accurate operations. The adoption of AI based reservation systems and digital platforms increases booking efficiency, optimizes staff workflows, and enriches customer service (Ramadhan and Suharto, 2024).

A study of two hotels in Palangkaraya concluded that integration for green operations, such as automatic door sensors and smart lighting controls, significantly improves energy efficiency and environmental performance, reducing costs and operational waste (Lundjo and Suwarno, 2025). Martina et al. (2025) report that AI based predictive analysis for culinary product innovation at Sheraton Senggigi improves operational efficiency in food and beverage through more accurate demand forecasting (Martina et al., 2025). AI systems for room booking automate reservations, speed up confirmations, and deliver recommendations aligned with guest preferences, which lowers operating costs and drives hotel revenue growth (Purbonegoro and Pitanatri, 2024).

3.2.3 The positive impact of AI implementation on customer experience in the hospitality industry

Nevertheless, AI implementation in Indonesia's hotel industry faces significant challenges. Technical data security is a primary concern. Harji and Suharto (2024) found that worries about guest data protection and user privacy hinder the use of digital systems in hotels. Infrastructure gaps also matter (Harji and Suharto, 2024). Ramadhan and Suharto (2024) note that uneven technology infrastructure, including limited internet access in remote areas and low budget hotels, hampers AI adoption (Ramadhan and Suharto, 2024). Costs are another barrier. High upfront investments for hardware, software, and training constrain small and midscale hotels (Purbonegoro and Pitanatri, 2024). Nontechnical barriers include shortages of skilled staff, employee resistance to change, and low digital competence, which call for effective change management strategies (Harji and Suharto, 2024). From an ethical perspective, five issues require attention, fairness, reliability, privacy, transparency, and accountability. Fairness means AI systems treat everyone fairly. Reliability means AI systems remain dependable in both normal and unusual conditions. Privacy means AI systems ensure security and respect individual privacy. Transparency means AI systems offer openness that users can identify. Accountability means AI systems are responsible for the decisions they take. These five aspects need attention in hotel AI use (Arisanti, 2023) (Permana et al., 2025). Another challenge is data reliability. Martina et al. (2025) emphasize that predictive analysis is effective only when guest data are high quality and supporting infrastructure is adequate (Martina et al., 2025).

A close reading of the journals shows that AI adoption in Indonesia's hotels remains at an early stage, yet it is growing quickly. AI technologies have shown tangible benefits, including gains in service efficiency and guest satisfaction (Hidayat and Setiawan, 2024) (Alda and Suharto, 2024).

4. CONCLUSION

The literature review shows AI adoption in Indonesia's hotel industry is expanding across operations. 24/7 chatbots increase front office responsiveness. IoT systems improve energy efficiency and room comfort. AI algorithms enable personalized guest services. AI use has a significant effect on operational efficiency and customer experience. Challenges remain. Key barriers include large upfront investment, uneven technology infrastructure, data security concerns, and organizational resistance. The literature indicates strong potential for AI to build hotel competitive advantage. Successful implementation requires attention to both technical and nontechnical aspects.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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